THE PRE-HISTORIC RACE IN INDIANA.

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ANTIQUITY OF THE RACE.

It is everywhere admitted that the antiquity of the pre-historic race in America is very great. Tangible evidence of this fact is everywhere at hand. Walls and mounds of stone and earth, ancient ditches and immense shell heaps, may be observed in nearly every locality. Variously fashioned implements of stone, copper, bone and cement are plentiful in every section of the country. The worn and polished condition of many of these implements indicates that they were in use for long periods of time. Implements of the hardest stone, evidently held in the hand of the workman while performing some labor, show distinctly the finger marks of the laborer, worn deep in the hard surface of the stone by years of continued use. Huge granite or syenite pestles were worn out and rendered utterly useless in the process of grinding corn or nuts. Immense stone axes are found everywhere, worn to worthlessness by continued application. Other implements of various kinds give evidence of great age, their worn and polished surfaces denoting many years of constant use.

The mounds and other earthworks themselves are hoary monuments of antiquity. Upon the actual age of these vast monuments of an ancient people scientists can only speculate. No written records of the tumuli nor their builders are in existence. It is palpably true, however, that long ages have elapsed since these earthworks were deserted as habitations, as sacrificial places or defensive works. Forests have grown about them; trees of gigantic size and immense age have grown upon them—have died, fallen and decayed upon them; the winds and storms of centuries have played about them, and the waters of ages have washed and eroded them since the last, lingering Builder took his final departure to the unknown region of limitless expanse. The mounds and other earthworks were noticed and commented upon by the very earliest explorers of the country. Huge forest trees were then decaying upon them. The Indians of those early days knew nothing about them. The earliest traditions of the Red Men threw no glimmering light upon them. No written records nor obscure history of them has ever been found. No engraved tablets nor distinguishable hyeroglyphics have ever been discovered to illustrate their history. We know, however, from their general

appearance, from the age of the forest trees that have grown upon them, and from the general condition of the remains found within them, that hundreds and perhaps thousands of years have elapsed since these works were finally abandoned. How long the mound-building fervor was upon this people, or how many centuries they were in erecting these monuments, we can not even surmise. It is evidently true that some of these earth-works possess a much greater antiquity than others, but to arrange them in chronological order, to begin with the most ancient and trace them down to the latest period, would be a task that no archæologist would undertake. We have no means of determining the exact age, nor the approximate age, of the remains which archæologists usually ascribe to be those of the true Mound Builders. Under some circumstances, however, we know that the osseous system of the human body has been preserved for thousands of years. Skeletons have been exhumed from the catecombs and caves of the East that have lain in those sepulchers for two or three thousand years, and yet, upon examination, it is found that even the animal matter in the bones has not been wholly destroyed. In many instances the remains of the Mound Builders were as favorably placed for preservation as were those of the ancient Egpytians, but in every instance it has been found that the animal matter in the bones of the former is wholly destroyed, and the earthy portion is so much decomposed as to soon crumble away on exposure to the atmosphere. The mummies of the East usually preserve the muscular tissues, skin and hair, while the best preserved skeletons of the Mound Builders yet exhumed rarely disclose more than a few of the larger bones of the body and skull. With the latter decayed fragments of the coarse cloths in which the body was wrapped are sometimes found, and rarely, pieces of bark and other material used in packing the body ere it was committed to its final resting place. The bodies of the Mound Builders were frequently placed in a perfectly cemented stone vault, or rude sarcophagus, and it is probable that before burial they were embalmed in some manner similar to that practiced by the aboriginal inhabitants of Mexico and South America. The remains of the ancient people of South America are found in a much better state of preservation than are those of the Mound Builders of our own section, and yet much less care seems to have been manifested in the interment of the dead of the former people than was exercised by the Mound Builders. The immense cemeteries of that region were usually located upon some dry, gravelly terrace. No vaults nor sarcophagi were used, but the bodies were simply buried in the gravel or sand at depths varying from two to eight feet. The embalming and wrapping process of the South Americans seems to have been similar to that practiced by the ancient Egyptians.

Our climate may not be quite so favorable for the preservation of human remains, under ordinary circumstances, as that of South America,

but the more elaborate arrangements of the Mound Builders for the preservation of their dead would fully compensate for the increased destructiveness of the climate. The inference, then, is that the antiquity of the Mound Builders is equal to that of the pre-historic race of South America. The mummies of Peru are probably as old as those of Egypt, hence we may assume that two or three thousand years at least have elapsed since the erection of the mounds.

The evidences of the greatest antiquity of man in the Mississippi Valley are those found in the mounds and other pre-historic works of that extensive region. The geological formations, other than the recent, do not show evidences of man's appearance upon the earth. In California, however, it is claimed that conclusive evidence is at hand to show that man inhabited the earth at a period as early as the Pliocene. The Pliocene does not occur in the Mississippi Valley east of the river, but if it is true that man's appearance on the globe dates back to the remote age of the Pliocene in California, we may reasonably assume that he was contemporaneous with *Elephas americanus, Mastodon giganteus, and Bos primigenius*, gigantic animals that continued their existence in the Mississippi Valley down to very recent times. Professor Whitney claims that it is quite common to find human implements of stone in connection with the remains of the Mastodon and Mammoth in the Pliocene of California. Other geologists claim to have found arrow and spear heads of obsidian in the Pliocene of Oregon. If that be true, we need not be surprised at any time to hear the announcement that human remains, or human implements have been found in connection with the remains of *Mastodon giganteus*, or *Elephas americanus* in some of the swamps or bogs of Indiana.

The obscure evidences of man's great antiquity, of an antiquity extending back to the epoch of the Miocene or Pliocene, while accepted by few archæologists and geologists, are still rejected by the multitnde. There is a proneness on the part of many scientists to push their theories in advance of corroborative facts. The true naturalist, the sincere inquirer, does not do this, but, on the contrary, he first carefully collects all his facts; he procures infallible data, and then announces the discovery of a new *truth*. But a difficulty occurs in this. What one may proclaim as conclusive evidence, another will accept with many misgivings, and a third reject altogether. These difficulties are met in attempting to fix the age of man in America. To one the evidences do not point to a period very greatly remote as the time of his appearance here, but to some others the evidence seems conclusive that some hundreds of thousands of years have elapsed since the genus *Homo* was first established upon the continent. If it is, indeed, true that man appeared upon the earth during the Pliocene age, then it may reasonably be assumed that he appeared in the Mississippi Valley at a period inconceivably remote, and the erection of the mounds may date back tens of thousands of years.

It is claimed, too, that many implements of stone have been found in the glacial Drift of New Jersey. The evidence seems to be indisputable that such is the case. When it becomes fully demonstrated to all that man appeared upon the eastern and western shores of the continent at the early periods mentioned, we will be forced to conclude that he inhabited the great interior plains during the same remote times, and absolute evidences of the fact will yet be found. The Indian belief in an autochthonous origin is not without its shadow of probability.

IDENTITY OF THE RACE.

There is not a unity of opinion upon this subject. Archæologists have labored assiduously to solve this question, and the great mass of evidence produced has given rise to many different theories. A modicum of proof may be advanced in support of almost any hypothesis, however unreasonable, but to establish a point in science the evidence must be sufficient to remove all reasonable doubts.

Some archæologists have arranged the period of man in the Mississippi Valley into four epochs, as follows:

1. Epoch of the Mound Builders.
2. Epoch of the Villagers.
3. Epoch of the Fishermen.
4. Epoch of the Indians.

They assume, of course, that the Fishermen were a distinct people from the Indians, the Villagers were distinct from the Fishermen, and the Mound Builders distinct from the Villagers. Each people is supposed to have occupied the country in the order named, beginning with the Mound Builders and ending with the Indians. In support of that theory I can say that the Indians were undoubtedly here at the period assigned them; there is to me absolute proof that the Fishermen were here; abundant evidence of the Villagers, and none will deny that the Mound Builders extended their influence from the lakes to the Gulf. But the question arises with great pertinency and force: "Were these not all one and the same people?" We know that the mounds were here at the time of the discovery of America. The Indians were here at the same time. There was no other people here. The Indians themselves knew nothing about the earth-works. Their traditions revealed nothing concerning any other people. The works are undoubtedly of human origin, and who will deny that the Indian had skill to erect them? The Ganowanian tribes certainly possessed intelligence sufficient to enable them to perform the rude architectural labors that produced all the earth-works of the Mississippi Valley. The march of the red men is a retrograde one. It has long been so. They were passing away when the white men first found them; they are passing away yet. The zenith of their history was reached ages ago.

They were once a great people, possessing a great empire. Then they cultivated the soil, they practiced rude arts, they erected the mounds. But they were always savages. They were men inured to the hardships of the chase, to the exigencies of war, the scourges of pestilental disease and the horrors of famine. My opinion is that under certain circumstances they were cannibals. I have found strong evidence of this fact in many different localities. A prevailing opinion has been that this people practiced cremation, that they burned their dead. It is not claimed that they universally did this, but it was occasionally done. It is well known that the American Indians are a very impulsive race. All savage peoples are. These impulses in most instances amounted to fanaticism. These fanatical impulses prevail throughout an entire tribe or nation. Our sad experiences with the Indian people have proved this fact conclusively. If it had been the practice of the ancient people of America, under some circumstances, to dispose of their dead by cremation, that practice would have been universal. All of their dead would have been disposed of in the same way. But we know this practice was not universal, even if it was ever resorted to by them. If the practice was not universal, did they indeed practice it at all? The evidences that have so far come under my observation lead to the conclusion that they did not. The calcined human remains that are frequently exhumed by the explorers of mounds rather suggest the thought that under dire emergencies, at least, this people were cannibals. If the many mounds in which calcined human bones are found were great funeral pyres, we would certainly expect to find no other than human remains within these monuments of an ancient superstition. We have no evidence that the superstitions of any idolatrous people on the globe ever carried them to the extent of performing the same funeral rites for the lower animals that they did for the dead of their own species. But if the Mound Builders were cremationists, they certainly performed the same obsequies for the wolf, the deer and many other animals peculiar to our latitude that they did for their own dead. I have frequently found the calcined bones of different animals indiscriminately mixed with charred human remains in the same mound. It was evident that the human bodies, as well as those of the animals, had been roasted and eaten.

In 1876, with the assistance of Mr. David Annis, an intelligent farmer of Dearborn County, Ind., I opened a mound on the farm of Mr. Ambrose Nowlin, two miles west of Lawrenceburg. The mound is situated upon the high bluffs of Tanner's Creek and overlooks the valley of the Great Miami and Ohio River. From the mound an excellent view may be had of Fort Hill, in Hamilton County, Ohio, distant some five or six miles. At Fort Hill are located some ancient fortifications and other works of the Mound Builders. The mound referred to commands an extensive view of the county for miles in every direction, and my first impressions upon visiting it were that it was one of the so-called "observa-

tories" or "signal stations." If it be true that certain mounds were erected solely for such purposes, I am still inclined to believe that this is one of them.

The mound is circular, ten feet in hight, and forty feet in diameter. A square shaft or hole was sunk from the center of the mound, at the top, to the bottom, The hole was about six feet square. After removing about eighteen inches of common soil and clay from the top, we came to a layer of clay burnt to a brick redness. This stratum was six or eight inches in thickness. It was followed by a layer of charcoal and ashes about eighteen inches in thickness. In this layer of charcoal and ashes were innumerable fragments of human and animal bones, charred and blackened by the fire. None of the pieces were more than five or six inches in length. As the work was continued, it was found that the layers of burned clay and ashes alternated in about the same manner until the undisturbed soil was reached at the bottom. In each layer of clay a few flint arrow-heads were found, generally broken. But two or three whole ones were obtained, and they were very small—about an inch in length. The calcined human and animals bones were found in every layer of charcoal and ashes. Pieces of charcoal four or five inches square were frequently found. The long bones were frequently found to have been split, as if to obtain the marrow. In one instance the round head of a human femur was found, with two or three inches of the shaft. The end of the shaft was burnt and blackened, while the round head of the bone showed but little of the action of fire. The ligament had evidently held it firmly inclosed in the *acetabulum* while it was exposed to the action of the fire. No portion of the pelvic bones were found. It is not a burial mound, in the true sense of the term, for we found no evidence that entire bodies had ever been deposited in it. No pottery, nor ornaments of any kind, were found within it. What, then, are the inferences to be drawn from it? It is very evident that a continual fire burned here for many years. North-east of this mound, from three to five miles, in the vicinity of the State line, and in the neighborhood of Elizabethtown, Ohio, is evidence of a great village. "Kitchen mounds" and "burial mounds" are there in great numbers. In fact, the whole second terrace of the river appears to be one vast cemetery. From one mound, on the farm of Mr. Abiah Hayes, at the State line, Mr. Annis and I obtained four skeletons in a very good state of preservation. Several skeletons had been taken out of the same mound before. Skeletons are found all over the sandy, alluvial terrace at depths varying from one foot to five feet. Pottery and implements of every kind are found in great abundance here. Many of the mounds in this locality have been opened, and while skeletons are common, I am not aware that charred or calcined human bones have ever been found in any of them. If cremation was practiced at the Nowlin mound, why were the same rites not performed here? The conclusion

that I have arrived at in summing up this matter is, that the charred human bones found in the Nowlin mound *are the remains of victims slaughtered and roasted for food.*

There are a number of other mounds on the bluffs of Tanner's Creek and the Ohio River, in the vicinity of the Nowlin mound, that have never been explored. Notably a very similar one on the farm of Mrs. Rowland, three-fourths of a mile south-west, and two on the Daniels farm, one and one-half miles south.

It may be urged that the remains found in the vicinity of Elizabethtown are those of a people who occupied the country long after the dispersion of the Mound Builders. It is quite evident that a large proportion of the burials were made long after the erection of the mounds; but I rather conclude that the mania for mound building only extended over a certain period in the history of that people; that a gradual change was wrought in their manners and customs and pursuits, and that from a people somewhat inclined to agricultural pursuits they slowly acquired a love for the chase, and finally accustomed themselves to depend almost wholly upon the precarious pursuit of game for their daily sustenance. They still continued to occupy the same localities as their permanent abodes, but during a great portion of the year pursued the nomadic habits of wandering huntsmen, known still to possess an overpowering charm for the Red Man of to-day, who, I conclude, is the direct descendant of the Mound Builder.

Prof. J. P. McLean, in his admirable little work entitled "The Mound Builders," argues that the Mound Builders were a people wholly distinct from the Villagers, who succeeded them. In this connection, page 131, he says: "It is pretty well established that since the time of the Mound Builders, and prior to the advent of the Indian, a race known as the 'Villagers occupied certain districts of this country, and made 'the garden beds" found in Northern Indiana, Lower Missouri, and in the valleys of the Grand River and St. Josephs, Michigan. These beds exist in the richest soil in that part of the country. Some of the lines of the plats are rectangular and parallel, others are semi-circular and variously curved, forming avenues differently grouped and disposed. The ridges are low, averaging four feet in width, and the depth of the walk between them is about six inches. They cover ten to one hundred acres, and sometimes embrace even three hundred acres. The beds are laid out with great order and symmetry, and have certain peculiar features that belong to no recognized system of horticulture. These beds are entirely different from the system of field culture practiced by the Indians, and no similar remains are connected with the enclosures of Ohio.

"It is evident that these beds do not belong to the epoch of the Mound Builders, for in some cases they extend over mounds which certainly would not have been permitted by the builders. Nor is it to be presumed

that these Villagers immediately succeeded their predecessors, for these encroachments must have been made long after the mounds had been abandoned and their purposes forgotten.

"It is a singular fact that but few, if any, of the aboriginal relics are found in them. *The beds are the only memorials of the race.** But from them we readily draw the conclusion that they were a settled, peaceable people of advanced tastes and industrious habits. Their implements and dwellings must have been of wood."

Many scientists agree with Prof. McLean in this theory concerning the "Villagers," but it will be observed that the assumption rests upon the most obscure data. "The beds," he says, "are the only memorials of the race." How frail, then, the evidence upon which this theory is established.

In the absence of corroborative proofs, I am inclined to the opinion that the so-called "garden beds" afford no evidence whatever of the former existence in this region of a people distinct from the Mound Builders or Indians. That these beds extend over the mounds is only evidence that the mound building mania had ceased, and that the tumuli were no longer regarded with veneration, nor still devoted to any special use, at the time of the creation of the "garden beds." Further than this, I am decidedly of the opinion that before the advent of white men, but one race of people ever had an existence upon the continent of America. The modifying influences of climate and time have caused the peculiarities of that race as exhibited in varieties of color, stature, mode of life and general characteristics, from the polar regions to the tropics. Upon the Pacific Coast slight immigrations from Asia, at a very ancient period, might have produced certain local modifications in the people of that region, which have lately been fully commented upon by several eminent scientists, who have made extended observations among the tribes of the extreme West. But these modifications do not extend beyond some slight variations in color, and some marked peculiarities of language in certain tribes wherein is observed a striking resemblance to some Asiatic tongues.

Prof. McLean, in his chapter on the identity of the Mound Builders, page 148, concludes as follows:

"It would be impossible to tell whether the Mound Builders were the original Nahoas, and as such immigrated into Mexico, or the Toltecs, and thus came later. Whichever may be true, still it appears to be certain that the Mound Builders did immigrate into Mexico. This is proved from the fact that the farther south we go we discover a gradual improvement in their structures, which finally develop into the higher architecture of Mexico.

"If the Mound Builders had come from Mexico, then their structures would have passed into a higher architecture as they proceed north.

*The italics are mine.—G.

"In the light of modern discovery and scientific investigation, we are able to follow the Mound Builders. We first see them in Ohio, engaged in tilling the soil and developing a civilization peculiar to themselves. Driven from their homes they sought an asylum in the south, from where they wandered into Mexico, where we begin to learn something more definite concerning them."

Right here occurs the query: What definite thing have we learned? To me it appears that we have actually learned nothing calculated to throw any light whatever upon the identity of the Mound Builders. The highly-colored Spanish tales of the enlightened and civilized condition of the ancient Mexicans were long ago discredited and laid aside as worthless fiction by our most eminent historians. None will deny that the Indians of Mexico were more peaceable, more inclined to agricultural and horticultural pursuits than were the Ganowanian tribes of the lakes and plains, but they were evidently less intelligent, and, if possible, more inhuman and brutal than their brethren of the north. However, in that region where the spontaneous productions of the earth yielded food sufficient to supply the necessities of the people for the greater portion of the year, it would naturally follow that the inhabitants would slowly but steadily acquire a knowledge of husbandry and horticulture. Less dependence would be placed upon the uncertain pursuit of game for their daily sustenance, and the nomadic habits of the huntsmen would finally be lost. The people would naturally turn to agriculture as the easiest and surest method of securing the necessaries of life.

But in the higher latitudes of the land a different condition of things prevailed. Here the indigenous fruits were few, and their season was short. Hence it followed that the capture of game must be largely relied upon to piece out a year's subsistence. A knowledge of the value of certain vegetables was acquired, and these were cultivated to a limited extent, but the main reliance of primitive man throughout the vast region of which the fertile fields of Indiana form a part, was upon a skillful use of the weapons of war and the chase, rather than upon the implements of agriculture. Hence we find such a large proportion of these implements evidently designed for purposes of destruction.

An agricultural people, whether savage or civilized, must have permanent homes near the scene of their labors; therefore, we find that the savages of ancient Mexico and the south-western part of the United States, while intellectually and physically inferior to their northern brethren, were, nevertheless, enjoying more of the fruits of an incipient civilization than were partaken of by the latter. The rude huts of the Indians of Mexico were built for permanent use, and were constantly occupied, while the wandering tribes of the north constructed only such temporary shelters as the exigencies of the season demanded.

IMPLEMENTS.

The implements of pre-historic man, found in Indiana, consist mainly of articles manufactured out of copper and iron ores, stone, clay, shells and bones. Archæologists have classified them as mortars, pestles, axes, scrapers or fleshers, arrow and spear heads, drills, knives, saws, awls, pipes, gorgets, ornaments, fish-spears, drinking and cooking vessels, etc.

These articles are frequently found in the mounds and other works, and they are widely scattered over the entire area inhabited by this primitive people. Over extensive districts where earthworks are unknown these implements are common, which shows conclusively that the manufacturers possessed the wandering habits of the existing tribes.

Mortars. These articles are not so common as some other implements; however, they are quite frequently found, especially in the southern part of the State. They occur generally in the neighborhood of what appears to have been permanent places of abode. They are found in the neighborhood of large earthworks, groups of mounds or shell heaps, and more frequently found upon the surface than exhumed from the mounds. Little or no care was exercised in attempting to shape the exterior of the mortar. Bowlders varying in diameter from six inches to two feet were generally selected, and the cavity seems to have been formed by actual use. No special design seems to have been followed in their manufacture. The cavities vary from two to six inches in diameter, and from a half inch to six or eight inches in depth. They seem to have been used in grinding grain or nuts for food. In some instances the same bowlder will have several cavities in it varying in depth and diameter. While making the geological survey of Tippecanoe County, I found one of these mortars at the residence of Mr. P. H. Weaver that had three or four cavities about two inches in diameter. Some of them were three or four inches deep. It was made of a bowlder about ten inches in diameter. In many instances slabs of limestone, and sometimes sandstone, were used for mortars.

In the Geological Report of 1872 is given a description of the large mortars in the caves or Rock Houses of Perry County; page 82: "In a large sandstone rock which had fallen from above, and which lies near the mouth of the cave but entirely beyond the roof, there are two ovoid holes about two feet apart. The largest diameter at the mouth is eight inches, shortest diameter six and a half inches, depth twenty-two inches, width at the bottom about three inches. The top of the rock, on the upper side, is about two and one-half feet above the ground. The direction of the holes is vertical, but, from the position of the rock, they run diagonally across the lines of bedding. At a rock-house in the conglomerate sandstone, in another part of the county, I saw similar holes, but paid little attention to them, supposing them to be "pot holes," that is, holes

formed by the abrading action of pebbles kept in action by the motion of running water. But here the position of the rock and the surroundings precluded the possibility of their having been produced by such agencies, and these holes must be looked upon as the work of the Indians, most likely the Mound Builders. To what use they were put is a matter of conjecture, but it is most probable that they served as mortars in which to crush acorns and roots as food. The long, pestle-shaped stones, which are not uncommon relics of the Mound Builders, would find in these holes a mortar suited to their length. Their great depth may result, in part at least, from the gradual wearing away of the sandstone by the act of pounding with a pestle made of much harder stone."

On page 88 is given a description of another series of mortars in what is known as "Indian Mortar Cave." "Within the mouth of this cave is a large stone, that has fallen from the roof, in which there is a number of round holes about six inches in diameter, one to two feet deep, and tapering down to the bottom. At that time I could not conceive of any use to which such narrow, deep holes could be put, and, notwithstanding the careful memorandum then made that the rock containing them was too far within the rock house for dropping water to reach it, and that there was no evidence showing that any body of water had ever issued from the cave, still I was loath to believe them artificial, and left the spot fully persuaded that they were produced in some unaccountable way by the action of water. But I have now not the slightest doubt that they were the work of the aborigines. I picked up a flint arrow-head at the mouth of this rock house and it is possible that many interesting relics and bones of animals could be found by digging up the bottom. In a field belonging to Mr. Peter Fealy, which is on a ridge near by, flint-flakes are to be seen in great abundance, and Mr. Fealy says he finds numbers of flint spear-heads, arrow-heads and stone axes every spring when he plows the field. Indeed, there is no want of evidence to show that the rock houses formed the abode of Indians, but whether of the Mound Builders or more recent races, or both, is a question which can only be satisfactorily answered by more extended researches."

Probably the average diameter of mortars found in this State is five inches, and the average depth about the same, or a little less. The mortars found in the South-west, especially in the vicinity of Santa Barbara, Cal., in many instances greatly exceed the size of our specimens. The mortars of that region are made of flinty sandstone or basaltic bowlders. They vary in diameter from five inches to two feet, and in depth from two to twelve inches. In that region, too, they are often highly ornamented. They are found in the graves there in great numbers, and, in some instances, seeds have been found within them. What is the suggestion that presents itself in this connection? Why are capacious and elaborately-wrought mortars found in that region, and small, crude specimens here?

In that region of indigenous fruits and seeds and grain, among a people relying upon the vegetable productions of Nature for their sustenance, the means of crushing and preparing the seeds and grain was a necessity, and "necessity is the mother of invention." Here, where the Indians depended almost wholly upon the pursuit of game, mortars were rarely used, and but little care was exercised in their manufacture. Consequently, the mortars in this region are few in number, small in size, and crude in form, compared to those of that region, where there was a greater demand and a greater supply.

Pestles. These implements, with the mortars, formed the mills of our ancestors. From them were evolved the great French buhrs that are fast becoming obsolete. Mortars and pestles have been in use, at some period, over the entire habitable portion of the earth. If man's faculties developed equally over the entire earth, during his earlier periods, then this process of grinding at the mills was going on in every land at once, for similar mills are found in every land.

Pestles are very common, much more so than the mortars. They were generally made of hard, granitic rocks, and specimens have been frequently found worn to absolute worthlessness. The typical form is cylindrical in shape, expanding at the base to the appearance of a knob. Cone-shaped specimens are also common. Two to three inches is the common diameter and six to eight inches the ordinary length, though specimens have been found exceeding two feet in length. Throughout the southern portion of the State these implements are very plentiful, but in the northern counties they are somewhat rare. They are usually found upon the surface, or are plowed out in the fields. They are rarely obtained from mounds. They are generally rudely wrought, and rarely polished, except by use. I have often seen them but three or four inches in length, and without the knobby expansion at the base. In those cases, I think, the expanded part had been wholly worn away, and the implement rendered worthless by use. Occasional examples are met with that have the knobby protuberance at each end. The California examples are usually much more elaborately wrought, and generally lack the expanded base. They are also much larger and longer than the average examples here. Near the end which is held in the hand they are frequently ornamented by one or more collars or rings, which give them a somewhat ornamental appearance. In that section, specimens more than two feet in length are quite common. Sandstone was a material quite frequently used in their manufacture there.

While it has been stated that pestles ornamented with carved figures of men and animals have been found in various localities, notably in New Hampshire and Vermont, I have never learned that any such have been found in Indiana.

Axes. In these implements we have common examples of Indian ingenuity. They were usually made of granitic material, and of various

forms and sizes. Occasional specimens are found of red or brown hematite. Stone axes, like the pestles and mortars, are found in every part of the habitable globe. They are of many different shapes and vary greatly in size. They are found weighing from one pound to twenty pounds or more, though the larger number of them weigh from two to five pounds. The grooved form is the type of the series. The groove is an indentation cut around the ax about one-third of the distance from the "poll" to the cutting edge. Occasionally specimens are found containing two grooves. These grooved axes are very common in Indiana, and are frequently exhumed from mounds. Some of them were very skillfully wrought, and others very rudely constructed. The handle is supposed to have been fastend to the ax by passing withes or thongs of rawhide around these grooves. In hand-to-hand encounters these axes were formidable weapons. Axes without the groove, and of sub-quadrangular form are also common. They are usually a little longer in proportion than the grooved specimens. Perforated axes, or axes with holes drilled through them for the attachment of handles, are sometimes found. These are usually much smaller in size, and more highly polished than the others. I saw a fine specimen of this form of ax, made of red hematite, in the possession of a lady at Hartsville, Ind., some years ago. It was about three and a half inches long, two and a half inches wide, and three-fourths of an inch thick. It was highly polished and a very beautiful specimen. It was found in that locality.

Scrapers. These implements, denominated also "peelers," and "fleshers," are numerous throughout the State. They usually have one plane and one convex side, the plane side beveled at the "bit" end. They are made of "greenstone," limestone, granite and other materials. They are of various sizes, and seem to have been used without a handle. The use commonly attributed to them is that signified in the appelation of "scrapers," etc. They are supposed to have been used in skinning animals, dressing hides and peeling the bark from trees. They are common objects in every collection of relics.

Arrow and Spear Heads. The only distinguishable feature between these two classes of implements is that of size, and the exact point at which to draw the line between them has never been determined. The smaller specimens are usually denominated arrow heads, and the larger examples spear heads. Chalcedony, obsidian, quartz and, very rarely, copper were used in their manufacture, but the greater mass of them were made of flint or chert. They are classified according to form* into triangular, indented, stemmed, barbed, leaf-shaped, lozenge-shaped, dart-shaped and beveled groups. They vary in length from diminutive specimens one-half inch long to elaborate examples twelve or fourteen inches in length. These are by far the most numerous relics of the pre-

*McLean's "Mound Builders," page 63.

historic race. They are scattered over every part of the land, and many localities yield them by the thousands. Great numbers of them are obtained in the vicinity of mounds and other works, and they are usually obtained in large numbers from the mounds also. *Caches* of them have been found containing several hundred, apparently unused specimens. These implements, attached to arrows, were probably the most effective instruments in obtaining food known to the Indians. In the hands of the skillful huntsman they were driven from the bow with a velocity sufficient to kill a deer or buffalo.

In war they were destructive instruments. I saw one a few years ago exhibited at the Cincinnati Exposition that had been shot into the back of a human, and was firmly imbedded in the spongy body of the v ertebra The fractured bone had grown firmly around it, the unfortunate individual having evidently carried it around in his back for years as a relic of his exploits.

Examples of arrow and spear heads are frequently seen with notched or serated edges.

Drills. There is a class of flint implements two to six inches in length, narrow and pointed, but widening rapidly at the base, that are usually supposed to be the instruments with which the many holes were drilled in the perforated stones and pipes.

The appellation of "rimmers" is also sometimes applied to these implements. They are quite common throughout the southern part of the State, but they are by no means as plentiful as the arrow heads, nor even the axes. They are generally found on the surface, and very rarely in the mounds. They are neatly executed instruments, but very easily broken and spoiled.

Knives. What are termed flint knives are quite common in this State. They are of various shapes, some long and pointed and others elliptical in shape. In many instances it requires a very enthusiastic expert to determine whether one of these flint implements is a knife, an arrow head or a spear head. The enthusiast who would determine this question would just as readily tell whether the object was manufactured by the Mound Builders or the Indians. It is just as difficult to determine between the implements of the so-called Mound Builders and those of the Indians as it is to determine whether a skeleton exhumed from a mound is that of an Indian or Mound Builder, and no more so.

Saws. Long, thin flint implements, with serated edges, are sometimes termed saws. These implements generally disclose fine specimens of workmanship. Their neatness of construction, considering the brittleness of the material of which they are made, is very remarkable. Their use, as well as that of many other implements enumerated here, is only conjectured. They are somewhat rare; still good specimens may be seen in many of the collections in this State.

Pipes. Pre-historic man appreciated the luxury of a pipe, and knew how to enjoy the subtle influences of tobacco smoke. The pleasing occupation of smoking was probably the greatest luxury enjoyed by him. In the manufacture of his pipe the greatest care was exercised, the greatest ingenuity displayed. The greatest variety of materials was used in the manufacture of these articles. In them a greater variety of designs are displayed than is shown in any other class of implements. In fact, it is a rare thing to find two pipes exactly alike in form and size. The nearest approach to similarity is seen in the tubular pipes of the West This variety of pipes is very rare, if found at all in Indiana. The most common material used in their manufacture was sandstone and steatite. Sandstone pipes are the more common in this State. Limestone was used to some extent, and a material commonly known as *striped slate.* An occasional example is found, made of some form of granite, and also cement pipes, formed of clay and powdered shells. They were made to represent almost every form of animal and bird known to the Indians. The human form is also rudely outlined in many examples. Probably bears, wolves, frogs and ducks are more frequently represented in their work than any other form of animals. In a large proportion of examples, however, the effort has been simply to make a pipe, something to use and enjoy, without ornament. There is almost as great a diversity in size as there is in the shape of the pipes, examples varying in weight from an ounce or two to ten or twelve pounds.

Mounds are fruitful sources of pipes, especially burial mounds. It seems to have been a custom at some period in the history of the race to bury various trinkets with the dead. The pipe, probably the most highly prized of a warrior's possessions, was often deposited with his body. Pipes are also frequently found in the vicinity of large earthworks, or groups of mounds, and along river terraces in the neighborhood of ancient cemeteries. They are often plowed out by the husbandman in the neighborhood of ancient earthworks.

Some archæologists affect to distinguish between a true Mound Builder's pipe and that belonging to the Indians. That operation is too delicate and subtle for me. I never could learn where nor how to draw the line. Perhaps if I could draw a line between the Mound Builder and Indian, between a Mound Builder's mound and an Indian mound; if I could distinguish between the former's skull and the latter's skull, between a Mound Builder's field and a Villager's garden, then I could determine between a Mound Builder's pipe and that of an Indian, and I might, too, be able to comprehend the civilized, enlightened condition of the Mound Builders as compared with that of the races of savages who succeeded them.

Hoes and Spades. Another interesting form of implements, left by this ancient people, is the hoes and spades. These are broad, thin, well-exe-

cuted implements of flint, generally elliptical in form, and varying in width from three to six inches, and in length from five to ten inches. While not found in great numbers throughout the State, they are still not uncommon.

Caches of them have frequently been found containing from fifty specimens to one hundred or more. In the *Hoosier Mineralogist and Archæologist* for May, 1885, Prof. L. H. Marshall, of Greensburg, Ind., mentions the finding of eighty leaf-shaped flint implements, from three to eight inches in length, all in a single nest within one and a half miles of that city. They were buried but slightly below the surface of the ground. In the September number of the same journal Prof. Marshall describes the finding of a similar *cache* on the boundary line between Johnson and Bartholomew counties. In this nest there were just one hundred leaf-shaped implements, from three to five inches in width and from six to nine inches in length. While on a visit to Greensburg, not long since, I was shown three or four of the implements secured by Prof. Marshall. They were very fine indeed. By many archæologists they are termed hoes or spades. The State Museum, at Indianapolis, contains a large number of similar implements. A similar *cache* of these implements was found near Orleans, in Orange County, Ind., some years ago, by Mr. Lo. Ostrander. Dr. M. N. Elrod, of Hartville, Ind., procured a few of the specimens found by Mr. Ostrander, and the others were unfortunately destroyed by fire. There were near a hundred in this *cache*. Implements of the same character are frequently found on the surface, but rarely in mounds. That they were used as hoes or spades is merely conjectured.

Awls. This is a term applied to a class of pointed implements, usually made of bone, but occasionally of copper and stone. While not so common as many other forms enumerated, these implements are still frequently found in this State. Quite a number of them have been procured from the mounds along the Ohio River from Aurora to Vevay. They are usually made of the long bones of the deer or some similar amimal.

Gorgets. A large class of implements, made of "striped slate" generally, has received the appellation of "gorgets." They consist of various forms of perforated stones, highly polished, and generally very beautiful. Some are shaped like a pick, others like a hammer, some are oval, and some crescent shaped. The use of these implements is only conjectured. Some suppose they were badges of office, some religious emblems, and others ornaments of some kind.

Ornaments. Bracelets, and other articles of copper, beads of shell, bones, copper and small perforated stones, are frequently found in excavating mounds. The bracelets are rude rings of hammered copper. In general, but little labor has been expended upon the beads, except to make the perforations.

Plummet-shaped implements of stone and iron ore, usually hematite, are frequently found, generally upon the surface, but sometimes in mounds. They are usually polished, and are very pretty little specimens. Like many other relics, their use can only be conjectured. Discoidal stones, or stones disc-like in shape, two to three inches in diameter, and from three-fourths of an inch to an inch in thickness, concave on both sides, and generally with a perforation in the center, are also common. It is not known to what use they were applied. Hundreds of sculptured implements of various materials and of all shapes, representing animals, birds, fish and reptiles, are found throughout the State and Union, which have no apparent relation to any economic use. They occur in mounds, sometimes in *caches*, but generally are picked up on the surface. An attempt to classify them would be bewildering in the extreme and wholly unsatisfactory.

Pottery. The material used in the manufact re of Indian pottery seems to have been a variety of clay mixed with powdered shells. The mixture formed a cement of great tenacity, and capable of resisting the action of fire to a great degree. The specimens of pottery obtained throughout this State are rude, compared to the work of civilized people, but they are remarkably well executed when we consider the condition of the Indians and their remote ancestors. The articles consist mainly of what appear to have been cooking pots, water vessels, cups—some are termed vases—and in a mound on the farm of Abiah Hayes, at the State line, near Elizabethtown, Ohio, I found a good specimen of earthen lamp about two inches in diameter, with a handle and depression on the side for the wick. The articles are all apparently hand-made, the manufacturers having had no knowledge of the potter's wheel; but the impressions left on the outside of many of the vessels indicate that they were moulded in a basket, or other article of wicker work, to give them the required shape. The vessels found are usually of a globular shape, with wide mouths, sometimes with handles on the sides and occasionally ornamented with rude lines of scroll work.

The second river terrace, near the State line, in the neighborhood of Elizabethtown, Ohio, is a fruitful source of these utensils. Thousands of fragments and many perfect specimens are found in that locality. On the same terrace above Lawrenceburg good specimens are sometimes found. At the mouth of Laughery Creek, two miles below Aurora, just in the edge of Ohio County, vast numbers of Indian relics have been found, including many perfect specimens of pottery. A number of mounds and shell heaps are located here. The mounds are located upon the second river terrace. Much of the pottery is found buried in the mounds. Much of this pottery is found along White, the Wabash and Ohio rivers. In the vicinity of the immense shell-heaps of Knox, Gibson and Posey counties many of the finest specimens have been found.

In the South-west, especially in Southern California, a very large proportion of the exhumed pottery is made of steatite, a variety of "soap-stone." Cups and other vessels are composed of the same material. The great globe-shaped steatite pots found there sometimes hold several gallons. I have never learned, however, that any steatite pots have ever been found in this State.

Although pieces of copper are occasionally found in the Drift of this State, it is altogether probable that the great mass of that metal used in the manufacture of the relics found here was procured from the great copper-producing districts of Lake Superior. Among the implements and ornaments of copper found in Indiana may be mentioned mauls, hammers, axes, awls, ear-rings, bracelets, beads, etc. The articles enumerated have all been made of native ore, hammered into the required shape. The beads were made of copper hammered into sheets, cut into strips and rolled into small, hollow, cylindrical bodies that could readily be strung on a string. The bracelets and rings were made by hammering the ore into a light rod and then bending it into the required shape, the ends usually overlapping each other.

THE MOUNDS.

Vast numbers of mounds are scattered over the surface of the State. By far the larger portion of them, however, are found in the southern part of the State. The favorite location for erecting these works was along the principal water courses. There are probably not less than five thousand mounds of all sizes in the State. In Ohio, with an area one-fifth larger than Indiana, the number of ancient earthworks is estimated at ten thousand to fifteen thousand. Probably 99 per cent. of the mounds of Indiana are composed of clay, sand and gravel, the other one per cent. of stone. In some of the northern counties of this State but few, if any, of these earthworks have ever been observed, while in some of the southern counties they are counted by the hundreds.

Form of Mounds. They vary considerably in form. A large proportion of them, however, are circular and conical. Many of them are in the form of truncated cones. Many are elliptical, some are square, and others octagonal. They are frequently terraced. Besides these, there are mounds termed "animal mounds," from a supposed resemblance to some form of animal. I do not know that any of these forms occur in Indiana, but they are quite numerous in Wisconsin and Michigan, and a few of them have been observed in Ohio. The "Great Serpent Mound," in Adams County, Ohio, is one of more than ordinary interest. "Alligator Mound," in Licking County, Ohio, is another remarkable work. "Big Elephant Mound," in Grant County, Wisconsin, has been figured and described in many different works on archæology. More extended observations throughout this State may reveal works of a similar character.

Location of Mounds. It has been remarked that, in general, the mounds are located near some important stream of water. They are rarely observed upon the low bottons that are subject to overflow. This fact was long ago observed by archæologists, and was referred to as an evidence of the foresight of the ancient builders. But if this people possessed the wisdom ascribed to them by those writers who advocate the theory that the Mound Builders were a distinct, and, to a great extent, a civilized people, the simple fact that they had foresight to erect their works above the points subject to annual overflow certainly proves no point of superiority above the faculties possessed by the Indians.

A favorite point for the erection of mounds was the gravelly second terrace of the rivers. These locations furnished excellent facilities for the erection of such works. The soil, consisting of sand, clay and gravel was easily moved. Besides, these were favorable locations for permanent homes. The loose, bottom lands were easily cultivated, the streams afforded fish, and the adjacent forests game for food. In general the mounds of the river terraces are promiscuously arranged and not regularly grouped. In general, too, the mounds of the terraces are larger than those upon the neighboring headlands or those on the upland plains. The very largest mounds of this State and Ohio are situated upon the terraces.

The projecting headlands of the river bluffs were favorite locations for the erection of mounds. Upon nearly every prominent point adjacent to the Ohio River, and many of its tributaries, one or more mounds may be found. These mounds overlook the neighboring valleys, and command extensive views, sometimes, for miles in every direction.

Upon the high plains, or "flats," adjacent to our larger streams, it is common to observe clusters or groups of mounds, sometimes arranged in a methodical manner. These groups vary in number from four or five to fifty or more. While they are generally promiscuously arranged, it is not uncommon to observe what appears to have been a systematic design in the order of their disposal. Sometimes they are arranged in circular rows about a large central mound, the smaller mounds at equal distance from each other, forming a complete circle. Again, they are arranged in lines to inclose a quadrangular space containing other mounds. Sometimes triangular areas are inclosed. Where not limited, however, by inequalities in the surface of the ground, the groups of mounds generally inclose circular or quadrangular areas.

Isolated mounds, occupying prominent points upon elevated tracts of land, are scattered all over the State. Sometimes these isolated mounds are located far from any water course. Occasionally pairs of mounds are observed similarly situated. Also small groups of three or four mounds are frequently noticed occupying positions upon commanding, elevated tracts.

Size of Mounds. There is a great diversity in the size of the mounds. Those that have not been disturbed by the plow of the agriculturist, vary in altitude from less than two feet to more than one hundred feet, and the range in diameter is from fifteen feet to five hundred feet. During the lapse of ages many of them, no doubt, have been wholly obliterated, and hundreds of others are scarcely discernible. The highest mounds now existing in this State probably do not exceed the hight of sixty feet, while the larger proportion of them range from two to ten feet in hight.

Classification. Archæologists have attempted to classify the mounds according to their obvious use. The classification embraces "Sepulchral" or "Burial Mounds," "Temple Mounds," "Sacrificial Mounds," "Observations," "Habitations," "Effigy Mounds," etc.

Sepulchral mounds are those in which the dead were interred. In his work, "The Mound Builders," page 50, Prof. McLean describes these burial mounds in the following language: "Mounds of sepulchre are very numerous, and usually have the form of a simple cone, but sometimes are elliptical, or pear-shaped. They are found without the walled inclosure and removed to a distance more or less remote. They vary from six to eighty feet in hight, but average from fifteen to twenty-five feet in altitude. Many are isolated and others occur in groups, sometimes connected at their bases. When they are found immediately connected, one of the group will be two or three times larger in dimension than any of the others, the smaller ones being arranged around its base, thus evidencing an intimate relation between them. These mounds invariably cover a skeleton, occasionally more than one, which is found near the original surface of the soil. Skeletons have been found in these mounds at various depths, and not infrequently in great numbers, but belonging to a more recent time, and generally of the Indian type. The skeleton of the Mound Builder is easily distinguished from these on account of its position in the mound. The body was enveloped in bark, coarse matting or else coarse cloth, and placed upon thin slabs of wood or other material, which formed the bottom of the tomb. Over it was sometimes built a vault of timber, and at other times it was inclosed in long and broad flags of stone. The skeleton is nearly always found disposed at length, with the arms carefully adjusted at the sides. * * * With the skeleton have been found personal ornaments, such as bracelets, perforated plates of copper, and beads of bone, ivory, shell or metal. Few weapons, such as spear or arrow points, are found; stone implements are common. Plates of mica are freqoently met with, and sometimes of such size as to almost completely cover the skeleton. The plates are often cut into regular figures, discs, ovals, etc. Vases of pottery are occasionally found."

The foregoing is a very elaborate description of many of the so-called burial mounds; more correctly, it is a complete description of the ideal

burial mound. The old Mound Builder himself at the bottom, with the skeletons of an "intrusive" race deposited promiscuously above and around him. I have, myself, assisted in opening several mounds which contained remains and relics deposited in a manner very similar to that described by Prof. McLean above; but who can tell whether or not the skeletons around and above the vault were those of a people distinct from that of the remains within the vault? Besides, in some instances, not one skeleton, but dozens and hundreds of them, have been found carefully placed in the same vault. If the remains of the single individual sometimes found in one of these cists are those of the chief, as is frequently assumed, why may not the remains deposited in the same mound about him be those of different members of his tribe—the real Mound Builders? If the vast numbers of skeletons found in the broad cemeteries of our river terraces and adjacent highlands, and the vast numbers found in the mounds themselves, but spoken of commonly as those of an intrusive race are not the remains of Mound Builders, where, then, are the Mound Builders buried? If the Mound Builders were the great and numerous people that their works indicate, they are certainly buried somewhere.

In the Smithsonian Report for 1881, page 591, Dr. Floyd Stinson, of Evansville, gives a brief description of some interesting mounds and cemeteries six miles south-east of Evansville, in Vanderburgh County, where he found six mounds, four distinct cemeteries, three lines of earth-works, one large stone cist and one altar. The following is his description:

"The first and most western mound is fifteen feet high, five hundred and eighty-five feet in circumference, truncated, and one hundred feet across the top. The second mound, east-north-east of this, is eight feet high and one hundred and fifty feet in circumference. This had been dug into by Charles Artes, who found in it some human bones, burnt earth, charcoal and ashes. Near this mound I found a stone cist which was eight feet long, four feet wide, four feet deep, walled with slate. In this were found several skeletons. Nearly north of this is a third mound, which is twenty feet high, four hundred and two feet in circumference, truncated, and sixty feet across the top. On the top of this mound, just below the surface, was burnt earth. Forty yards from this I found a remarkable altar. The roof, which was sand rock, was plowed off; the sides and ends were slate, four inches thick; the floor the same as the roof rock. Inside it was three feet long, two feet wide and fourteen inches deep. The contents of this altar were, first, earth, then one-half peck of burnt and charred bones, charcoal, and ashes. Part of the bones were human (the patella and head of the femur). Beneath this was burnt earth, and below that, earth.

"East-south-east from the second mound is a fourth mound, which is one hundred and fifty feet in circumference and four feet high. To the east of this is one of the most remarkable mounds I ever beheld. It is

one hundred yards long, one hundred yards wide, and square; consequently, it is four hundred yards around. It is forty-five feet high to a plateau, the width of which is one hundred and eighty-five feet. Then, at the south-west corner, on the top, there is an additional mound, fifteen feet high, which would make a mound sixty feet high. Then, at the west end, there is an elevated platform four feet high, one hundred and fifty feet long and fifty-five feet wide. I will designate this as the fifth mound. East and west of this great mound are burying-grounds. All of the graves in this section are walled with slate. East of this again is a sixth mound, which is ten feet high and thirty yards in circumference. Around these six mounds is a line of earth-work, resting at either end on the river bank, and inside of this are two other short ones. The outer line is about one mile in length. The middle and inner lines are about two and one-half feet high, and about every forty yards there are mound-like widenings on the outer edges. One-half mile north-east of these mounds is a mound fifty feet high and one hundred and sixty-four yards in circumference."

The discoveries of Dr. Stinson I consider of very great importance. Here are works of a remarkable character and great extent, connected with which are extensive cemeteries, in which the dead have been placed in uniformly walled graves. If one or more races of men preceded the Indians on this continent, whose are the remains that are deposited here? To me it is evident that the men who erected the earth-works are the men who dug and walled the adjacent graves, and buried their dead within them. I think that a thorough examination of the works would reveal much of interest to the scientific world.

Temple mounds are in the form of truncated cones or pyramids. They are the largest in size, and are characterized by the greatest regularity of construction. The great, square mound described above, by Dr. Stinson, is evidently a temple mound. It is supposed that originally they all had graded ways leading to the summit. In many instances those graded ways are yet discernible. Archæologists with vivid imaginations have pictured sacred temples upon these mounds, with adoring multitudes facing the east, bowing with superstitious adoration before the rising sun. Temple mounds are said to be octagonal, oblong, square, round or oval in outline. They vary in this respect as greatly as do any other class of mounds. About the only distinguishing feature, then, of a temple mound, from a superficial examination, is its truncated appearance. I think that the term "Temple Mounds" applied to these works has no more pertinency than the terms "Council Mounds" or "Theater Mounds" would have.

Sacrificial mounds contain the so-called altars, upon which an unknown race of men offered unknown sacrifices to unknown deities. An altar mound can not be distinguished from others except by an exploration of

the interior. The altar is usually found near the original surface of the ground, and generally consists of a receptacle of stone, varying in form and dimensions. Sometimes it is said to have been made of baked clay. Mounds are occasionally examined containing a series of these altars, one above another. Ashes, charcoal and calcined bones are usually found in the altars, and pipes, gorgets, beads and ornaments of various kinds upon them. Among the earth-works of our State these altar mounds form a fair proportion.

Observatories, termed also "signal stations" and "lookout mounds," are those mounds which are situated upon the prominent points and headlands overlooking river valleys and the adjacent country. It is thought that a series of these works, within a communicable distance of each other, extends the entire course of the Ohio River from the Alleghanies to the Mississippi. I have personal knowledge of the existence of such a series between Cincinnati, Ohio, and Rising Sun, Ind., a distance of thirty-five miles by rail and pike. Each mound, at the stations named below, is within easy view of the neighboring mounds above and below. Beginning at Cincinnati, where there are a number of mounds, they may be observed at the following points:

On bluff west of Storrs, Ohio.
On bluff south of Ludlow, Ky.
On Kentucky and Ohio bluffs at Anderson's Ferry.
On bluff north of Delhi, Ohio.
On Kentucky bluff opposite North Bend, Ohio.
On headland between Ohio and Miami rivers.
On bluff west of Hardintown, Ind.
On Tanner's Creek bluff west of Lawrenceburg, Ind.
On Kentucky bluff opposite Lawrenceburg, Ind.
On divide between Tanner's and Wilson creeks, Indiana.
On bluff south of Aurora, Ind.
On bluff at Split Rock, Ky.
At Rising Sun.*
Near Gunpowder Creek, Kentucky.
Dibble Farm, two miles south of Patriot, Ind.
Taylor Farm, below Log Creek.
Opposite Carrollton, Ky.
Below Carrollton.

These stations cover a distance of more than sixty miles along the Ohio River. In the same region, within a distance of three or four miles from the Ohio River, there are probably not less than five hundred other mounds; so that it is not clear, by any means, that these works were designed for signal stations. Dozens of other mounds have been observed along the same bluffs, and it certainly can not be that all were designed

*This and the following stations are taken from Indiana Geological Report for 1872.

for purposes of observation. They are usually conical in form, and round or elliptical at the base. Their contents consist of burnt earth, ashes, charcoal, bones which are frequently charred, and relics of various kinds, In this locality the explorations have not been extended enough to determine their true character.

The grouped mounds, especially those upon the river terraces, are sometimes termed "habitation mounds." There is nothing peculiar in their external appearance, aside from their location and connection, to indicate their character. They are recognized by the "kitchen middens," household refuse, contained within them, or to be found in the immediate vicinity. The immense shell-heaps, so frequently observed along our water courses, and their contiguous mounds, are included in this class.

Effigy, or symbolical mounds, are those in which an effort has been made to represent the form of some animal, or other creature, in bass-relief. These, as before remarked, are frequently observed in other States, but I have no knowledge of any in Indiana. They occur in Wisconsin by the hundreds, representing almost every form of animal known to this continent.

The contents of these mounds vary. Some contain nothing but ashes, charcoal and burned earth. If bodies were ever deposited within them the skeletons have long been wholly decomposed, and all traces of them are obliterated. Others contain stone cists, or vaults, in which are sometimes found well-preserved skeletons. Some years ago twelve skeletons were found inclosed in a well-molded earthen vessel which rested upon a shapely furnace of unhewn stone, eighteen feet in length, in a large mound at Lancaster, Ohio. The mound was twenty feet in hight and fifty feet in diameter. In addition to the skeletons inclosed in the vaults, sometimes dozens of skeletons are found in the same mound, irregularly disposed about. Besides these, innumerable relics of various kinds are sometimes found in the same mound.

Of the many mounds in Indiana, probably not more than five per cent. of them have ever been explored, and in but a small portion of these has the work been systematically done. It is to be regretted that sufficient means have never been placed in the hands of the State Geologist to secure a systematic and thorough examination of these works. If the many shell-heaps that are found in Martin, Daviess, Knox, Greene, Gibson, Perry and other counties were examined in detail, and the work thoroughly done, many perplexing questions might be solved.

EMBANKMENTS AND INCLOSURES.

Works of this character are not so numerous in this State as they are in the adjoining State of Ohio. Prof. McLean states that there are more than fifteen hundred inclosures in Ohio.

Inclosure walls and embankments are usually constructed of clay, but sometimes of stone. A ditch usually accompanies the wall. The ditch is frequently found upon the outside of the wall, but in general it is upon the inside—like a modern earth-work hastily erected in front of a hostile enemy. Two classes of inclosures are mentioned by archæologists—sacred inclosures, surrounding temple and sacrificial mounds, and defensive works. The walls inclosing the temple mounds near Evansville, Ind., may be classed among the sacred inclosures.

While it is possible that many of the mounds were erected for the celebration of religious rites, I am inclined to think that all the earth-works inclosing them should be termed defensive works rather than sacred inclosures, as it seems very evident that the walls were built for the defense of the other works.

In Franklin County, Indiana, there is an interesting series of earth-works. They are situated upon the bluffs of the east fork of White Water River. The wall here is three or four hundred yards in length, and from three to four feet high, accompanied by an outside ditch about two to three feet deep. The wall is built across a narrow ridge, which projects into the valley in the form of a headland, the steep bluffs on either side forming a naturally impregnable barrier. The inclosed area contains about fifteen acres. Many mounds are located in the immediate vicinity of the earth-works. These works are situated three or four miles north of Brookville.

Dearborn County contains an interesting fortification also. It is situated upon the bluff of the Ohio River, three miles north of Lawrenceburg. A full description of these works, by Samuel Morrison, Esq., with map and drawings, was published in the Indiana Geological Report for 1878, page 121. In connection with that is a description and figures of the remarkable works at Fort Hill, on the headland between the Great Miami and Ohio rivers, in Hamilton County, Ohio. Some slight mention of these works has been made in the body of this paper. They are located just across the Miami River, not more than three-fourths of a mile from the State line.

"Fort Azatlan," near Merom, in Sullivan County, was named and described by Prof. John Collett in the Indiana Geological Report for 1870, page 238.

Probably the most interesting works of this character yet discovered in this State are those near Anderson, in Madison County. They were fully described and figured by Prof. Cox in the Gelogical Report for 1878, page 129 et al.

On page 134 of the same report is described the magnificent inclosures near Winchester, in Randolph County, Ind. These works are figured on page 137 of the same report.

In the Geological Report for 1874, page 25, Prof. Cox described and figured some remarkable inclosures on the bluffs of the Ohio River, in the eastern edge of Clark County, Indiana. In the same report, page 31, similar works near New Washington, Clark County, are figured and described.

An interesting inclosure, walled with stone and situated in the northwest corner of Jefferson County, Indiana, is also described and figured in the Geological Report for 1874, page 32.

In the Geological Report for 1882, page 194, Dr. A. J. Phinney describes a small inclosure in Franklin Township, Randolph County, Indiana.

In the Geological Report of 1875, page 238, Drs. M. N. Elrod and E. S. McIntyre describe an inclosure one mile east of Paoli, Orange County, Indiana. On page 198, of the same report, Prof. W. W. Borden describes a quadrilateral inclosure two miles from Versailles, in Ripley County. Also, a circular embankment, near Osgood, in the same county.

In the Geological Report of 1881, page 148, Dr. Phinney describes a small inclosure in Delaware County.

During the progress of the geological survey of this State, the State Geologists and their assistants have endeavored to give a summary, at least, of the archæology of the State. While prosecuting the geological survey of the counties in detail, special attention has also been given to the antiquities, and the results of investigations in that direction have been given in connection with the Geological Report. Below are given references to the various Geological Reports prior to this, and the pages in them in which references are made to archæology:

Geological Report of 1869—

Archæology of Franklin County, by Dr. Rufus Haymond, page 198.

Geological Report of 1870—

Archæology of Martin County, by Prof. E. T. Cox, State Geologist, page 110.

Archæology of Sullivan County, by Prof. John Collett, page 237.

Geological Report of 1872—

Archæology of Perry County, by Prof. John Collett, pages 82, 88 and 141.

Archæology of Pike County, by Prof. John Collett, page 287.

Archæology of Jasper County, by Prof. John Collett, page 299.

Archæology of White County, by Prof. John Collett, page 305.

Archæology of Dearborn, Ohio and Switzerland counties, by Prof. Robert B. Warder, page 413.

Geological Report of 1873—

Archæology of Warren County, by Prof. John Collett, page 246.

Archæology of Lawrence County, by Prof. John Collett, page 310.

Archæology of Knox County, by Prof. John Collett, page 370.

Archæology of Gibson County, by Prof. John Collett, page 410.

Geological Report of 1874—
Antiquities (State in general), by Prof. E. T. Cox, State Geologist, page 24.
Archæology of Jackson County, by Prof. W. W. Borden, page 60.
Archæology of Scott County, by Prof. W. W. Borden, page 133.
Geological Report of 1875—
Archæology of Huntington County, by Prof. John Collett, page 130.
Archæology of Vigo County, by Prof. John Collett, page 114.
Archæology of Jennings County, by Prof. W. W. Borden, page 174.
Archæology of Ripley County, by Prof. W. W. Borden, page 196.
Archæology of Orange County, by Drs. M. N. Elrod and E. S. McIntyre, page 238.
Archæology of Vanderburgh County, by Prof. John Collett, page 297.
Archæology of Owen County, by Prof. John Collett, page 356.
Archæology of Montgomery County, by Prof. John Collett, page 418.
Archæology of Steuben County, by Prof. E. T. Cox, State Geologist, page 500.
Geological Report of 1878—
Antiquities (State in general), by Prof. E. T. Cox, State Geologist, page 121.
Archæology (An address delivered before the Indiana State Archæological Society, at Indianapolis, Ind., October 15, 1877), by Prof. E. T. Cox, State Geologist, page 138.
Archæology of Wayne County, by Prof. J. C. McPherson, page 219.
Archæology of Harrison County, by Prof. John Collett, page 419.
Geological Report of 1880—
Vincennes and Worthington Mounds, by Prof. John Collett, State Geologist, page 387.
Geological Report of 1881—
Archæology of Shelby County, by Prof. John Collett, State Geologist, page 84.
Archæology of Fountain County, by Dr. R. T. Brown, page 124.
Archæology of Delaware County, by Dr. A. J. Phinney, page 148.
Archæology of Bartholomew County, by Dr. M. N. Elrod, page 204.
Geological Report of 1882—
Archæology (State in general), by Prof. John Collett, State Geologist, page 37.
Archæology of Newton County, by Prof. John Collett, State Geologist, page 6.
Archæology of Jasper County, by Prof. John Collett, State Geologist, page 73.
Archæology of Marion County, by Dr. R. T. Brown, page 96.
Archœology of Decatur County, by Dr. M. N. Elrod and Prof. L. H. Marshall, page 151.

Archæology of Jay County, by Prof. David S. M'Caslin, page 167.
Archæology of Randolph County, by Dr. A. J. Phinney, page 192.
Geological Report of 1883—
Archæology of Posey County, by Prof. John Collett, State Geologist, page 68.
Archæology of Morgan County, by Dr. R. T. Brown, page 83.
Archæology of Johnson County, by Prof. David S. M'Caslin, page 135.
Archæology of Rush County, by Dr. M. N. Elrod, page 114.
Archæology of Grant County, by Dr. A. J. Phinney, page 153.
Geological Report of 1884—
Archæology of Hamilton County, by Dr. R. T. Brown, page 28.
Archæology of Madison County, by Dr. R. T. Brown, page 37.
Archæology of Fayette County, by Dr. M. N. Elrod, page 60.
Archæology of Union County, by Dr. M. N. Elrod, page 73.